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Expert Report of
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Department of General Services

Prepared for: **Hahn & Hessen LLP**
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QUALIFICATIONS

William E. Longo, Ph.D.

I have a Bachelor of Science degree in Microbiology, a Masters of Science in Engineering and a Doctoral of Philosophy in Material Science and Engineering, all from the University of Florida. After receiving my Ph.D. in 1983, I remained at the University of Florida and became a Visiting Assistant Professor in 1985 in the Material Science and Engineering Department. While at the University of Florida, my research included the characterization of cancer drug targeting systems by electron microscopy. From this research, I hold a patent for the synthesis of protein microspheres for the drug targeting applications.

In 1983 I founded Micro Analytical Laboratories (MAL) Inc., which became one of the first commercial labs in the country to provide Transmission Electron Microscopy (TEM) analysis of asbestos-containing air and dust samples. I left MAL in 1987 to become President of Materials Analytical Services (MAS), Inc. headquartered in Atlanta, Georgia. In addition to Atlanta, MAS Inc. had offices in Raleigh, North Carolina, Phoenix, Arizona, Santa Clara & Los Angeles, California and Washington D.C. MAS Inc. specialized in the characterization of materials for the following industries: Environmental, Industrial Hygiene, Building and Construction Products, Electronics, and Semiconductors.

In December of 2006, MAS Inc. was changed to MAS LLC with offices in Atlanta, Georgia and Los Angeles, California. The company's focus now is primarily industrial hygiene and environmental laboratory testing of samples. MAS also provides materials characterization of products for VOC testing and industrial hygiene consulting activities.

Currently, over 10% of MAS's staff has their Ph.D.'s, and the technical group at MAS includes industrial hygienist, certified industrial hygienists, geologists, biologists, microbiologists, environmental chemists, material scientists, electron and optical microscopist and product emission specialist. The MAS laboratory in Atlanta is approximately 20,000 square feet and contains state-of-the-art analytical equipment.

MAS has provided laboratory analysis and consulting services to a wide range of private, public, and government entities. These groups include NASA, the Center for Disease Control, NBC, the University of Tokyo, IBM, FAA, GSA, NATO, the National Institutes of Health, W.R. Grace, Celotex, Intel and the EPA to name a few. MAS has extensive experience over many years in the analysis of bulk samples of asbestos for purposes of performing micro-analytical product identification. MAS performed this analysis on thousands of bulk samples of asbestos-containing fireproofing and acoustical material ("Surface treatment ACM") for a variety of companies. MAS was selected as an Approved Laboratory by several bankruptcy trusts. MAS also provided product identification analysis for the State of Hawaii, State of Texas, State of Utah, State of New York, the city of New York, city of Boston, and the Port Authority of New York and New Jersey.



The product identification consulting work I have performed was in the context of litigation and involved the materials characterization of unknown surface treatment ACM. Typically such analysis requires that a bulk sample of ACM be analyzed with a variety of analytical techniques to determine the constituent ingredients and their proportionality, which are then compared to the manufacturers' known product formulas as well as to information regarding application techniques which may have varied with the formulas or products.

I and MAS have also provided consulting and analytical services to former asbestos manufacturers, which included W.R. Grace's Construction Products Division. This work involved a request by W.R. Grace ("Grace") that MAS analyze air samples collected by Grace during the spraying of Fireproofing for tremolite/actinolite airborne fiber levels.¹ W.R. Grace sought to learn if the tremolite/actinolite contamination in the vermiculite would be airborne during the spraying process. Because of the overloading of the air samples by the vermiculite, the W.R. Grace Representatives requested that all the air samples be analyzed by the indirect method. This work was not done for litigation purposes.

I was a member of the Environmental Protection Agency (EPA) Peer Review Group, which consisted of five members who peer reviewed the EPA's findings in their ongoing asbestos research with regard to asbestos in building issues. The Peer Review Group provided the EPA with guidance for their continuing asbestos research, and with insight regarding new issues that needed to be addressed. I was also a member of an EPA panel that drafted the micro-vacuum ("Microvac") asbestos dust method in 1989 that measured asbestos surface contamination. I served as both Vice Chairman and Chairman of the TEM Analytical Committee for the National Asbestos Council ("NAC"). I am the primary author of the American Society for Testing and Materials (ASTM) D-5755-95 Dust Sampling Method for the Quantification of Asbestos Surface Contamination ("ASTM D-5755 Dust Sample Method") that was approved and promulgated as an ASTM standard method in 1995. For my leadership role in developing the ASTM dust method, I was presented an Award of Appreciation by the D-22 Committee on Sampling and Analysis of Atmospheres.

I have been qualified as an expert in both State and Federal court as a material scientist, an electron microscopist, with regard to the use of optical and electron microscopy for the characterization of asbestos-containing products and as an industrial hygienist relating to asbestos issues.

My billing fee for consulting, deposition, and trial testimony is \$300.00 per hour. My opinions which are described in this report are based on my experience as a materials characterization scientist, my review of the scientific literature and the data, tests and other information which are reviewed, discussed and referenced in this report. These opinions are expressed to a reasonable degree of scientific certainty.

¹ John J. Henningson, W.R. Grace & Co., personal communication. William E. Longo, Ph.D., Materials Analytical Services, Inc., personal communication.



1.0 Report Overview

The State of California, Department of General Services has requested that I review the MVA dust analysis for a number of their buildings located in California to determine the extent, if any, of asbestos contamination issues that may have been caused by in-place W.R. Grace asbestos-containing surface treatment products. I have been provided by the Hahn & Hessen Law Firm the MVA constituent analysis of bulk surface treatment materials, as well as dust sample data, that was also generated by MVA from the various buildings at issue for review.

This expert report provides my opinions concerning the interpretation of the asbestos-containing surface dust contamination data, generated by MVA, for the various State of California Department of General Services Buildings that are at issue in this matter. This report will also discuss my opinions of the source of the asbestos surface contamination in these buildings as it relates to the in-place W.R. Grace asbestos-containing surface treatment products. This report will also discuss the potential for significant exposure to respirable airborne asbestos fibers to individuals who disturb the W.R. Grace asbestos surface dust caused by the in-place surface treatment material.

In the past it has been the position of W. R. Grace, and their experts, that any release of asbestos fibers from asbestos-containing dust caused by their in-place asbestos-containing surface treatment products in buildings is encapsulated and in the particle size range that is not readily respirable by building occupants or maintenance personnel. As discussed and referenced extensively in my previous expert and rebuttal reports (December 8, 2005, October 25, 2006 & July 24, 2007) there is an abundance of published and unpublished field data collected by MAS and other environmental consultants that refutes these erroneous claims by W.R. Grace and their expert Dr. Richard Lee.^{2, 3, 4} My expert opinions discussed in those previous three expert reports are adopted in this matter.

1.1 Executive Summary of Opinions

1. It was established by MVA and the Courts that each of the twelve State of California, Department of General Services Buildings discussed in this expert report contained W.R. Grace asbestos-containing surface treatment products. These materials were either their Monokote-3 fireproofing or their Zonolite Acoustical Plastic.
2. Surface dust samples collected by CSC and analyzed in accordance with ASTM D5755-03 by MVA demonstrated that all eleven buildings, at some level, contained significant amounts of asbestos surface contamination. One building, the Fairfield Development Center, which contained W.R. Grace Zonolite Acoustical Plastic on the ceiling, was

² William E. Longo, Ph.D., Expert Report "The Scientific Reliability of the ASTM D-5755-3 Dust Method for the Quantification of Asbestos Surface Contamination", December 8, 2005.

³ William E. Longo, Ph.D., Expert Report Prepared on Behalf of the Property Damage Asbestos Claimants Represented by the Law Firm of Dias & Hile, LLP, October 25, 2006.

⁴ William E. Longo, Ph.D., Expert Rebuttal Report for Asbestos P.I. Claims, July 24, 2007.



essentially encapsulated with multiple layers of paint. The encapsulation on the ceiling reduced the amount of asbestos surface contamination usually found on the surfaces in buildings that contain this material.

3. The finding of vermiculite in each dust sample analyzed, and Libby amphibole asbestos in 10 of 11 dust sample sets taken in these buildings, demonstrates that the source of the asbestos surface contamination found in the buildings was from the in-place W.R. Grace surface treatment products (Monokote-3 or Zonolite Acoustical Plastic).
4. The amount of asbestos surface contamination measured in each of the buildings was primarily at the high to severe concentration level (from 100,000 to 1,000,000 asbestos structures per cm²). Asbestos surface concentrations at this level can be easily re-entrained by maintenance workers in these buildings producing significant levels of airborne asbestos fibers. The quantitative amount of free respirable asbestos fibers and bundles measured in these dust samples by the ASTM Method represent an exposure hazard in the State of California, Department of General Services Buildings discussed in this report.
5. The ASTM D5575 dust analysis method is a scientifically reliable method, has a measurable standard rate of error and is widely accepted in the scientific community. Also this method has been subject to peer review and published. A statement by Dr. Richard Lee, in his many W.R. Grace Expert Reports, that the ASTM D5575-03 is not accepted by the scientific community is not based on any credible or authoritative evidence.
6. Dr. Richard Lee has claimed in his many expert reports that W.R. Grace's in-place asbestos-containing surface treatment materials are somehow unique in comparison to every other asbestos-containing friable materials when he states that "when fractured they break into composite particles, not free fibers". His statement has no scientific basis, nor is it based on any reliable data.

2.0 State of California, Department of General Services Buildings with Dust Sample Analysis

2.1 Conservation Center, 5100 O'Bynes Ferry Rd., Jamestown

MVA has performed a constituent analysis of bulk sample number MVA5394-N0468 and determined that the fireproofing sample they analyzed was W.R. Grace's Monokote-3 fireproofing.⁵ The MVA constituent analysis opinion for this building was verified by the Courts in this action.

⁵ MVA Project 5394, Asbestos Constituent Analysis, W.R. Grace Claim #10633, DGX Claim #1011572, Conservation Center, 5100 O'Bynes Ferry Road, Jamestown.



Besides the product ID analysis, MVA also performed dust analysis on four samples (S0944 through S0947) that were collected on ceiling hatch-surfaces in various areas of the Conservation Center using the ASTM Method D5755-03.⁶ MVA's analytical results showed that the surface dust samples contained between 140 thousand to 447 thousand asbestos structures per cm^2 . Also, the MVA dust analysis showed that each of the samples they analyzed contained vermiculite.

It is my opinion, based on MVA's product ID and surface dust analysis, that the Monokote-3 in the Conservation Center building has caused a very significant amount of asbestos contamination on the surfaces in the building that are in the general vicinity of the W.R. Grace fireproofing.

It is also my opinion that the finding of vermiculite along with the chrysotile in this settled dust sample set demonstrates that the source of the asbestos structures found in the dust samples was from the W.R. Grace Monokote-3.

2.2 Atascadero State Hospital, 10333 El Camino Real, Atascadero

MVA has performed a constituent analysis of bulk sample number MVA5394-N0471 and determined that the fireproofing sample they analyzed was W.R. Grace's Monokote-3 fireproofing.⁷ The MVA constituent analysis opinion for this building was verified by the Courts in this action.

Besides the product ID analysis, MVA also performed dust analysis on five samples (S0934 through S0938) that were collected on return air plenums in various areas of the Atascadero State Hospital using the ASTM D5755-03 Method.⁸ MVA's analytical results showed that the surface dust samples contained between 2.7 million to 30.0 million asbestos structures per cm^2 . Also, the MVA dust analysis showed that each of the samples they analyzed contained vermiculite.

It is my opinion, based on MVA's product ID and surface dust analysis, that the W.R. Grace Monokote-3 in the Atascadero State Hospital building has caused severe asbestos contamination on the surfaces in the building that are in the general vicinity of the W.R. Grace fireproofing.

Also, it is my opinion that the finding of vermiculite, along with the chrysotile and Libby amphibole fibers, in this settled dust sample set demonstrates that the source of the asbestos structures found in the State Hospital dust samples was from the in-place W.R. Grace Monokote-3.

⁶ MVA5394 Report of Analysis of Settled Dust, Conservation Center, August 29, 2007.

⁷ MVA Project 5394, Asbestos Constituent Analysis, W.R. Grace Claim #10650, DGS Claim #1011578, Atascadero State Hospital, 10333 El Camino Real, Atascadero.

⁸ MVA 5394 Report of Analysis of Settled Dust, Atascadero State Hospital, August 30, 2007.



2.3 Sierra Smith Regional HQ, 1234 E. Shaw Ave., Fresno

MVA has performed a constituent analysis of two bulk samples numbered MVA5394-N0450 & N0452 (layer A) and MVA5394-N0450 & N0452 (layer B), and based on their analysis determined that layer A in the two samples was W.R. Grace's Zonolite Acoustical Plastic, and layer B was W.R. Grace's Zonolite Finish Coat.⁹ The MVA constituent analysis opinion for this building was verified by the Courts in this action.

Besides the product ID analysis, MVA also performed dust analysis on four samples (S0948 through S0951) that were collected on various surfaces in the Sierra Smith Regional HQ using the ASTM Method D5755-03.¹⁰ MVA's analytical results showed that three of the four surface dust samples collected and analyzed contained between 363 thousand to 1.5 million asbestos structures per cm². Also the MVA dust analysis showed that each of the samples that contained asbestos also contained vermiculite.

It is my opinion, based on MVA's product ID and surface dust analysis, that the W.R. Grace Zonolite Acoustical plaster material in the Sierra Smith Regional Headquarters building has caused high to severe asbestos contamination on most of the surfaces in the building that are in the general vicinity of W.R. Grace's asbestos-containing surface treatment material. One sample (S0951) showed no detectable amounts of asbestos. Therefore, the area that this sample was taken (top of a refrigerator) was not contaminated at the time the dust sample was taken.

Also it is my opinion that the finding of vermiculite, along with the chrysotile and Libby amphibole, in this settled dust sample set, clearly demonstrates that the source of the asbestos structures found in the three Sierra Smith Regional HQ dust samples was from the in-place W.R. Grace Zonolite Acoustical material.

2.4 State Correctional Facility, End of Hwy 202, Tehachapi

MVA has performed a constituent analysis of bulk samples numbered MVA5394-N0473 & N0477 and determined that the fireproofing samples they analyzed was W.R. Grace's Monokote-3 fireproofing.¹¹ The MVA constituent analysis opinion for this building was verified by the Courts in this action.

Besides the product ID analysis, MVA also performed dust analysis on four samples (S0952 through S0955) that were collected on various surfaces in the State Correctional Facility using the ASTM D5755-03 method.¹² MVA's analytical dust results showed that

⁹ MVA Project 5394, Asbestos Constituent Analysis, W.R. Grace Claim #10651 & 10659, DGS Claim #1011573 & 1011574, Sierra Smith Regional HQ, 1234 E. Shaw Ave., Fresno.

¹⁰ MVA 5394 Report of Analysis of Settled Dust, Sierra Smith Regional HQ, September 11, 2007.

¹¹ MVA Project 5394, Asbestos constituent Analysis, W.R. Grace Claim #10656 & 10660, DGS Claim #1011579 & 1011580, State Correctional Facility, End of Hwy 202, Tehachapi.

¹² MVA 5394 Report of Analysis of Settled Dust, State Correctional Facility, End of Hwy. 202, Tehachapi.



three of the four surface dust samples collected contained between 1.2 million to 195 million asbestos structures per cm^2 . Also the MVA dust analysis showed that each of the samples that contained asbestos also contained vermiculite. One sample (S0952) showed that the concentration of asbestos in that sample was below the detection limit.

It is my opinion, based on MVA's product ID and surface dust analysis, that the W.R. Grace Monokote-3 in the State Correctional Facility building has caused severe asbestos contamination on many of the surfaces in the building that are in the general vicinity of W.R. Grace's asbestos-containing fireproofing material.

Also, it is my opinion, that the finding of vermiculite, along with the chrysotile and Libby amphibole fibers, in this settled dust sample sets clearly demonstrates that the source of the asbestos structures found in the State Correctional Facility dust samples was from the in-place W.R. Grace Monokote-3.

2.5 Northern California Youth Correctional Center, 7650 South Newcastle, Stockton

MVA has performed a constituent analysis of three bulk samples numbered MVA5394-N0024, N0026 & N0028, and determined that the fireproofing samples they analyzed was W.R. Grace's Monokote-3 fireproofing.¹³ The MVA constituent analysis opinion for this building was verified by the Courts in this action.

Besides the product ID analysis, MVA also performed dust analysis on five samples (S0939 through S0943) that were collected on various surfaces in the Youth Correctional Center using the ASTM Method D5755-03.¹⁴ MVA's analytical results showed that three of the five surface dust samples collected contained between 20 thousand to 14 million asbestos structures per cm^2 . Also the MVA dust analysis showed that each of the samples that contained asbestos also contained vermiculite.

It is my opinion, based on MVA's product ID and surface dust analysis, that the W.R. Grace Monokote-3 in the Youth Correctional Center facility has caused low to severe asbestos contamination on the surfaces in the building that are in the general vicinity of the in-place W.R. Grace Monokote-3.

Also it is my opinion that the finding of vermiculite, along with the chrysotile and Libby amphibole fibers, in this settled dust sample sets clearly demonstrates that the source of the asbestos structures found in the Youth Correctional Center dust samples was from the in-place W.R. Grace Monokote-3.

¹³ MVA Project 5394, Asbestos Constituent Analysis, W.R. Grace Claim #14411 & 10653, DGS Claim #1011586 & 1011588, Northern California Youth Correctional Center, 7650 south Newcastle Road, Stockton.

¹⁴ MVA 5394 Report of analysis of Settled Dust, Northern California Youth Correctional Center, August 29, 2007.



2.6 Office Building # 8, 714 P Street, Sacramento

This building is an 18-story structural steel building where asbestos-containing fireproofing was applied to the steel members located above the suspended ceiling tiles throughout the building and on the exposed steel beams in the mechanical rooms.¹⁵

MVA performed a constituent analysis of bulk sample number MVA5394-N0327 and determined that the fireproofing sample they analyzed was W.R. Grace's Monokote-3 fireproofing.¹⁶ The MVA constituent analysis opinion for this building was verified by the Courts in this action.

Besides the product ID analysis, MVA also performed dust analysis on five samples (S0847 through S0851) that were collected on various surfaces in the 714 P Street Office Building using the ASTM Method D5755-03.¹⁷ MVA's analytical results showed that the dust samples they analyzed contained between 150 million to 443 million asbestos structures per cm². Also the MVA dust analysis showed that each of the samples that contained asbestos also contained vermiculite.

It is my opinion, based on MVA's product ID and surface dust analysis, that the W.R. Grace Monokote-3 in the 714 P Street office Building has caused severe asbestos contamination on the surfaces in the building that are in the general vicinity of the W.R. Grace fireproofing material.

Also it is my opinion that the finding of vermiculite, along with the chrysotile and Libby amphiboles, in this settled dust sample sets clearly demonstrates that the source of the asbestos contamination found in this building was from the in-place W.R. Grace Monokote-3.

2.7 Office Building # 9, 744 P Street, Sacramento

This building is an 18-story structural steel building where asbestos-containing fireproofing was applied to the steel members located above the suspended ceiling tiles throughout the building and on the exposed steel beams in the mechanical rooms.¹⁵

MVA has performed a constituent analysis of bulk sample number MVA5394-N0320 and based on their analysis determined that the fireproofing sample they analyzed was W.R.

¹⁵ CSC Project #1012995, Asbestos Expert Report W. R. Grace & Co. et al. Case No. 01-01139 (JKF), January 11, 2007.

¹⁶ MVA Project 5394, Asbestos Constituent Analysis, W.R. Grace Claim #10652, DGS Claim #1011576, Office Building #8, 714 P Street, Sacramento.

¹⁷ MVA 5394 Report of Analysis of Settled Dust Office Building #8, 714 P Street, Sacramento.



Grace's Monokote-3 fireproofing.¹⁸ The MVA constituent analysis opinion for this building was verified by the Courts in this action.

Besides the product ID analysis, MVA also performed dust analysis on five samples (S0837 through S0841) that were collected on various surfaces in the 744 P Street office Building using the ASTM D5755-03 Method.¹⁹ MVA's analytical results showed that the surface dust samples collected contained between 419 thousand to 41 million asbestos structures per cm². Also the MVA dust analysis showed that each of the samples that contained asbestos also contained vermiculite.

It is my opinion, based on MVA's product ID and surface dust analysis, that the W.R. Grace Monokote-3 in the 744 P Street Office Building has caused high to severe asbestos contamination on the surfaces in the building that are in the general vicinity of the W.R. Grace asbestos-containing fireproofing material.

Also it is my opinion that the finding of vermiculite, along with the chrysotile and Libby amphibole fibers, in this settled dust sample sets clearly demonstrates that the source of the asbestos contamination found in this building was from the in-place W.R. Grace Monokote-3.

2.8 Ventura Youth Correctional Facility, 3100 Wright Road, Camarillo

This building is a one-story concrete structure where asbestos-containing fireproofing was applied to the concrete decking above the suspended acoustical ceiling panels.¹⁵

MVA has performed a constituent analysis of bulk sample #MVA5394-N00409 and determined that this material was W.R. Grace's Monokote-3 fireproofing.²⁰ The MVA constituent analysis opinion for this building was verified by the Courts in this action.

Besides the product ID analysis, MVA also performed dust analysis on five samples (S0890 through S0894) that were collected on various surfaces in the Ventura Youth Correctional Facility using the ASTM D5755-03 method.²¹ MVA's analytical results showed that four of the five surface dust samples collected contained between 419 thousand to 41 million asbestos structures per cm². No asbestos was detected in dust sample S0893. Also, the MVA dust analysis showed that each of the samples that contained asbestos also contained vermiculite.

¹⁸ MVA Project 5394, Asbestos Constituent Analysis, W.R. Grace Claim #10662, DGS Claim #1011577, Office Building #9, 744 P Street, Sacramento.

¹⁹ MVA 5394 Report of Analysis of Settled Dust Office Building #9, August 29, 2007.

²⁰ MVA Project No. 5394, Asbestos Constituent Analysis, W.R. Grace Claim #10658, DGS Claim #1011575, Ventura youth Correctional Facility, 3100 Wright Road, Camarillo.

²¹ MVA 5394 Report of Analysis of Settled Dust Ventura Correctional Facility, August 29, 2007.



It is my opinion, based on MVA's product ID and surface dust analysis, that the W.R. Grace Monokote-3 has caused severe asbestos contamination on many of the surfaces in the building that are in the general vicinity of the W.R. Grace asbestos-containing fireproofing material.

Also it is my opinion that the finding of vermiculite, along with the chrysotile and Libby amphibole, in this settled dust sample sets clearly demonstrates that the source of the asbestos contamination found in the Ventura Youth Correctional Facility was from the in-place W.R. Grace Monokote-3.

2.9 Resources Building, 1416 9th Street, Sacramento

This building is a 17-story structural steel building where asbestos-containing fireproofing was applied to the steel members above the suspended ceiling tiles and other structural steel members throughout the building.¹⁵ On the 17th floor the fireproofing is exposed to the occupied space below.

MVA has performed a constituent analysis of bulk sample #MVA5394-N0032 and determined that this material was W.R. Grace's Monokote-3 fireproofing.²² The MVA constituent analysis opinion for this building was verified by the Courts in this action.

Besides the product ID analysis, MVA also performed dust analysis on five samples (S0842 through S0846) that were collected on various surfaces in the Resources Building using the ASTM D5755-03 Method.²³ MVA's analytical results showed that the dust samples collected contained between 3.6 million to 123 million asbestos structures per cm². Also the MVA dust analysis showed that each of the samples that contained asbestos also contained vermiculite.

It is my opinion, based on MVA's product ID and surface dust analysis, that the W.R. Grace Monokote-3 in the Resources Building has caused severe asbestos contamination on many of the surfaces in the building that are in the general vicinity of W.R. Grace's asbestos-containing fireproofing material.

Also it is my opinion that the finding of vermiculite, along with the chrysotile and amphibole fibers, in this settled dust sample sets clearly demonstrates that the source of the asbestos contamination found in the Resources Building was from the in-place W.R. Grace Monokote-3.

²² MVA Project No. 5394, Asbestos Constituent Analysis, W.R. Grace Claim #10649, DGS Claim #1011589, Resources Building, 1416 9th Street, Sacramento.

²³ MVA 5394 Report of Analysis of Settled Dust, Ventura Youth Correctional Facility, August 29, 2007.



2.10 Stockton State Building, 31 East Channel Street, Stockton

This building is a 4-story concrete frame building structure where asbestos-containing fireproofing was applied to the steel decking above the suspended ceiling tiles and other structural steel members throughout the building.¹⁵

MVA has performed a constituent analysis of bulk sample #MVA5394-N0022 and determined that their analytical data was W.R. Grace's Monokote-3 fireproofing.²⁴ The MVA constituent analysis opinion for this building was verified by the Courts in this action.

Besides the product ID analysis, MVA also performed dust analysis on five samples (S0832 through S0836) that were collected on various surfaces in the Stockton Building using the ASTM Method D5755-03.²⁵ MVA's analytical results showed that four of the five surface dust samples collected contained between 307 thousand to 123 million asbestos structures per cm². Dust sample S0835 was found not to contain asbestos. Also the MVA dust analysis showed that each of the samples that contained asbestos also contained vermiculite.

It is my opinion, based on MVA's product ID and surface dust analysis, that the W.R. Grace Monokote-3 in the Stockton State Building has caused severe asbestos contamination on many of the surfaces in the building that are in the general vicinity of the in-place W.R. Grace asbestos-containing fireproofing material.

Also it is my opinion that the finding of vermiculite, along with the chrysotile and amphibole fibers, in this settled dust sample sets clearly demonstrates that the source of the asbestos contamination found in the Stockton State Building was from the in-place W.R. Grace Monokote-3.

2.11 Fairfield Development Center, 2501 Harbor Boulevard, Costa Mesa

This building is a 4-story and basement concrete structure where asbestos-containing acoustical plaster was applied to the ceilings throughout the facility.¹⁵

MVA has performed constituent analysis bulk samples (MVA5394-Q1885, Q1886, Q1887 & N0024) and determined that this material was W.R. Grace's Zonolite Acoustical Plaster.²⁶ The MVA constituent analysis opinion for this building was verified by the Courts in this action.

²⁴ MVA Project No. 5394, Asbestos Constituent Analysis, W.R. Grace Claim #10661, DGS Claim #1011591, Stockton State Building, 31 East Channel Street, Stockton.

²⁵ MVA 5394 Report of Analysis of Settled Dust, Stockton State Building, August 29, 2007.

²⁶ MVA Project No. 5394, Asbestos Constituent Analysis, W.R. Grace Claim #10654 & 10657, DGS Claim #1011582 & 1011584, Fairfield Development Center, 2501 Harbor Boulevard, Costa Mesa.



Besides the product ID analysis, MVA also performed dust analysis on five samples (S0880 through S0884) that were collected on various surfaces in the Fairfield Treatment Center using the ASTM D5755-03 method.²⁷ MVA's analytical results showed that only one of the five surface dust samples collected and analyzed contained asbestos (837 thousand asbestos structures per cm²). The other four dust samples were found either not to contain asbestos or below the detection limit of the ASTM dust method. Also, the MVA dust analysis showed that the one sample that contained asbestos also contained vermiculite.

It is my opinion, based on MVA's product ID and surface dust analysis, that the W.R. Grace Zonolite Acoustical Plastic in the Fairfield Treatment Center has caused some asbestos contamination the surfaces in the building that are in the general vicinity of W.R. Grace's asbestos-containing material.

These dust analysis results were somewhat surprising in that only one of the five dust samples collected showed any significant levels of asbestos contamination. My experience in the past with dust samples collected in the vicinity of W.R. Grace Zonolite Acoustical Plastic, has usually demonstrated high to severe levels of asbestos contamination. However, the January 11, 2007 CSC report discussed how the Zonolite Acoustical Plastic, in this building, was covered with multiple coats of paint to the extent that the normally rough surface of the acoustical plaster was visually smooth and only had some areas with localized damage.¹⁵ This surface treatment ceiling material was in fact encapsulated and therefore, would inhibit the release of asbestos fibers and thus reduce possible surface contamination normally seen with Zonolite Acoustical Plastic. Without the multiple paint coatings on the W.R. Grace material, it would be my opinion that the W.R. Grace Zonolite Acoustical Plastic would have caused more wide spread surface contamination at the high to severe level. It is also my opinion that encapsulating the Zonolite Acoustical Plastic with paint in this building is not a recommended long term solution for exposed asbestos-containing surface treatment material. Paint is not an adequate barrier for preventing damage to the in-place material. In fact, the January 11, 2007 CSC report describes localized damage in various locations on the ceiling to the Zonolite ceiling plaster. The report goes on to say that this "damage mostly appeared to have been caused by accidental physical contact".

Also it is my opinion that the finding of vermiculite along with the chrysotile and amphibole fibers, in the one settled dust sample, clearly demonstrates that the source of the asbestos contamination found in that sample was from the in-place W.R. Grace Zonolite Acoustical Plastic.

²⁷ MVA 5394 Report of Analysis of Settled Dust, Fairfield Development Center, August 29, 2007.



3.0 State of California, Department of General Services Building without Dust Sample Analysis

3.1 28 Civic Center Plaza, Santa Ana

I have reviewed the constituent analysis by MVA of bulk sample (MVA5394-N0028) in which they have determined that this material was W.R. Grace's Monokote-3 fireproofing.²⁸ The MVA constituent analysis opinion for this building was verified by the Courts in this action.

I was not provided with any surface dust analysis data for the Civic Center Plaza building but the fact that this facility contains W.R. Grace Monokote-3, which would have been installed before 1973, allows me to render the opinion that surfaces in the building below the MK-3 would be contaminated with asbestos fibers. Unless these surfaces are routinely cleaned, the asbestos contamination level would be at the high to severe level.

The reason I can render this opinion without dust samples for this particular building is as follows;

1. W.R. Grace Monokote-3 is defined by the Environmental Protection Agency as a friable material.²⁹ That is, the hardened in-place material can be crushed with hand pressure causing the release of asbestos-containing dust causing surface contamination and asbestos contamination of the person disturbing the Monokote-3 material
2. Over the last 20 years I have been involved in the analysis of thousands of dust samples collected in the general vicinity of friable asbestos-containing W.R. Grace surface treatment materials.³⁰ These dust samples were taken in a large number of different buildings spread out across the United States. Almost without exception, the results of all these dust sample analyses demonstrated that the surfaces under the W.R. Grace products usually had high to severe asbestos contamination. In the majority of the samples tested, the in-place W.R. Grace products did not have any visible damage.

Based on all these analyzed surface dust samples taken in the general vicinity of W.R. Grace surface treatment products, there is no logical or scientific reason that the Monokote-3 material would behave any differently than the Monokote-3 did in all these other buildings that were tested for asbestos contaminated surface dust.

²⁸ MVA Project No. 5394, Asbestos Constituent Analysis, W.R. Grace Claim #10648, DGS Claim #1011585, 28 Civic Center Plaza, Santa Ana.

²⁹ EPA Guidance for Controlling Asbestos-Containing Materials in Buildings, EPA 360/5-85-024, July 1985.

³⁰ Hatfield, R.L., Krewer, J.A. and Longo, W.E.: "A Study of the Reproducibility of the Micro-Vac Technique as a Tool for the Assessment of Surface Contamination in Building with Asbestos-Containing Materials", Advances in Environmental Measurement Methods for Asbestos, ASTM STP1342, Beard, M.E. & Rook, H.L., EDs., American Society for Testing and Materials, 2000.



4.0 Vermiculite and Libby Amphibole Fingerprints for W.R. Grace Surface Treatment Products

It has been established by both MVA and the Courts that the asbestos-containing surface treatment products (fireproofing and acoustical plaster) in the twelve State of California, Department of General Services Buildings discussed in this report, were manufactured by W.R. Grace. It has also been established in this report that the building surfaces in the general vicinity of the W.R. Grace material in these buildings have significant amounts asbestos contamination.

Even though it may seem as common sense that the source of the asbestos causing the surface contamination would be the in-place W.R. Grace material, there is additional analytical information provided with the MVA dust analysis data that, in my opinion, eliminates any other significant source for the asbestos in the surface dust samples other than the in-place W.R. Grace products. This additional information is the MVA findings of both vermiculite and tremolite (Libby amphiboles) in each of the dust sample sets (Libby amphiboles were found in 10 of the 11 dust sample sets).

The formula for both Monokote-3 and Zonolite Acoustical Plaster calls for, among other things, vermiculite as the filler in the product. For Monokote-3 the amount of vermiculite is approximately 35% and for Zonolite Acoustical Plaster the amount is approximately 60 to 70% by weight.³¹ In each of the dust samples that were analyzed by MVA in this matter, vermiculite was found and identified. Also MVA reported in 10 of the 11 dust sample sets the finding of Libby amphibole fibers. Libby amphiboles are a fingerprint for W.R. Grace vermiculite.

In 1963 W.R. Grace purchased the Zonolite Company, which included their vermiculite mine in Libby Montana, and it was the vermiculite from this mine that was used in the W.R. Grace formulations for Monokote-3 and Zonolite Acoustical Plaster.³¹ It has been well established in the scientific community and admitted to by W.R. Grace that the Libby vermiculite mine is contaminated with amphiboles and that these amphiboles have a unique chemical fingerprint as compared to others.³¹ Therefore, the finding of significant amounts of chrysotile fibers along with vermiculite and Libby amphiboles in the surface dust that was collected in the vicinity of the in-place W.R. Grace surface treatment products in these buildings at issue, can only lead one to conclude that the source of the asbestos contamination measured in the MVA dust samples was the W.R. Grace materials.

5.0 Asbestos Contaminated Surface Building Dust

As previously discussed in this report, the surface dust analysis for the buildings at issue has established that the surfaces in the general vicinity of the in-place W.R. Grace surface treatment products are contaminated with chrysotile, and to a lesser degree, Libby amphiboles. In my report when I discuss asbestos contamination, I am defining it as an amount of asbestos on the

³¹ William E. Longo, Ph.D. Expert Report, "W.R. Grace Asbestos-Containing Construction Products: A Review of Asbestos Types and Source", September 15, 2006.



surface of a building where that surface or area cannot be used or maintained as its intended purpose. That is, if the amount of asbestos on that surface is high enough where it cannot be maintained (cleaned or disturbed etc.) without instituting industrial hygiene controls to stop possible re-entrainment of the asbestos dust, then that surface is contaminated.

For example, the surfaces on the air plenums that were sampled at the Atascadero State Hospital showed contamination levels of between 2.7 million to 30.0 million asbestos structures per cm^2 that was caused by the in-place Monokote-3. At this high concentration of asbestos contamination any work on the air plenums, without industrial hygiene controls, would cause, in my opinion, that asbestos dust to become re-entrained into the breathing zone of the maintenance personnel doing that work. The amount of this re-entrainment, in my opinion, could exceed the 1972 OSHA excursion limit of 10 fibers/cc. This would of course depend on the amount of disturbance and duration of the maintenance activity. The reason for this opinion will be discussed in length below in section 6.0.

Each of the buildings discussed in this report has asbestos contaminated surface dust that would have the same issues with maintenance activities involving the asbestos contaminated surfaces as discussed with the Atascadero State Hospital.

6.0 Potential Exposure Hazard from Asbestos Contaminated Surface Dust

One argument presented by W.R. Grace's expert, Dr. Richard Lee, is that he provides opinions that the ASTM D-5755-3 Dust Sample Method will dissolve encapsulated asbestos-containing particulates and break large asbestos structures into smaller respirable asbestos fibers thereby artificially inflating surface asbestos number count concentration. Dr. Lee claims that the dust that has accumulated under W.R. Grace's ACM products, such as Monokote-3 fireproofing, does not contain free respirable asbestos structures, only large asbestos containing particulates.³²

If Dr. Lee's opinion that the presence of free respirable asbestos structures found in the ASTM Dust Sample Method analysis is caused by the indirect preparation method, which he claims dissolves and breaks up large (non-respirable) asbestos containing particles, is correct, then an examination of W.R. Grace's asbestos-containing fallout dust by a direct preparation method should yield no respirable size asbestos structures. One way to examine the surface dust by the direct preparation method is to re-entrain (to make airborne) asbestos-containing surface dust into the air while collecting air samples during the dust disturbance activity.

It has been, and is, our opinion that the ASTM D-5755 Dust Sample Method provides an accurate index of the asbestos contamination level in surface dust. Further, it has been and is our opinion that the indirect preparation method does not artificially inflate the concentration of asbestos fibers present in a surface dust sample but instead provides accurate information regarding the size and shape of the asbestos structures in such surface dust samples taken from

³² Richard J. Lee, Ph.D. Expert Report "For Asbestos Property Damage Claims Lack of Hazard Proceeding", January 15, 2007.



the vicinity of in-place Grace ACM. Our most recent studies described in this report support our position and again demonstrate that Dr. Lee's position is without merit.

In order to determine the validity of Dr. Lee's criticism of the ASTM D-5755 Dust Sample Method, MAS personnel performed a series of studies involving the analysis of direct air, indirect dust and direct dust samples by collecting the re-entrained Monokote-3 surface dust as well as the dust created by W.R. Grace in-place asbestos-containing surface treatment products from contaminated building surfaces. These studies were designed to directly characterize what the asbestos structures look like in surface dust. The studies were as follows:

1. Tucson Convention Center (TCC) Music Hall attic study. MAS' personnel visited the TCC music hall where they performed four activities that caused settled dust on surfaces to become re-entrained into the breathing zone of the workers performing the work activities. Direct air samples (AHERA style) were collected and analyzed and compared to previously analyzed surface dust samples. The sprayed fireproofing in the TCC Music Hall attic was identified as W.R. Grace Monokote-3 fireproofing.
2. Lancaster Keist Branch Library study. In 1991 a work practice study was performed in the Library where ceiling tiles were removed and replaced (a copy of the Lancaster study is attached to this report as Appendix A). Archived air samples from that study were retrieved and analyzed at our laboratory by both the NIOSH 7400 method (PCM) and the AHERA style TEM direct method. The TEM air sample analysis was then compared to the indirect dust sample analysis collected during that study in 1991.

My October 25, 2006 Expert Report (reference 3 to this report) provides a full discussion of the experimental procedures, results and conclusions for these three studies. The findings and conclusion of those studies are as follows:

The TCC experiment consisted of disturbing the Monokote-3 surface dust in the attic using simple cleaning methods while collecting personal air samples using standard sampling techniques. The air samples were analyzed by the direct method using both NIOSH (PCM) and EPA (TEM) procedures. If Dr. Lee is correct in his opinions concerning the characteristics of the asbestos in the settled dust (large non-respirable particles) then air samples should not contain any respirable asbestos structures. It has been stated in the past by Dr. Lee that the direct preparation technique does not disturb the integrity of the collected asbestos structures thereby preserving the size and shape of the fibers. Therefore, if Dr. Lee's opinion concerning the characteristics of the asbestos in settled dust holds true, then when the asbestos containing surface dust is re-suspended in the air, no respirable size asbestos fibers should be detected in the directly prepared air samples that were collected during the activity. On the other hand, if Dr. Lee's opinion is in error and our position is correct, then the directly prepared air samples should collect respirable size asbestos structures that are characteristic of the asbestos structures measured by the indirect ASTM D-5755 Dust Sample Method, since the source of the asbestos fibers in the air samples is from the disturbed asbestos contaminated settled dust samples.



The Tucson TCC experiment proves that Dr. Lee is wrong about his opinions concerning the ASTM D-5755-3 Dust Sample Method. The results from our studies demonstrated the following:

The rag cleaning study had a PCM range of less than 0.45 to 8.43 f/cc. For the hand brushing study the PCM results had a range of 0.64 to 6.62 f/cc. The compressed air study resulted in a range of 5.82 to 8.56 f/cc and the insulation removal study had a range of 1.92 to 8.51 f/cc.

For the direct EPA AHREA style analytical results the rag cleaning study had a TEM range of 4.19 to 54.36 structures/cc. For the hand brushing study the TEM results had a range of 12.22 to 17.97 structures/cc. The compressed air study resulted in a range of 7.97 to 35.23 structures/cc and the insulation removal study had a range of 21.30 to 90.31 structures/cc.

When the Monokote-3 dust was re-entrained into the breathing zone of the investigators, the directly prepared air samples contained significant levels of respirable airborne asbestos fibers and structures as measured by both the PCM and TEM. Dr. Lee's opinion is that no respirable size asbestos structures are contained in the surface dust and therefore none should be contained in the air samples. The Tucson experimental findings do not support Dr. Lee's opinion that only large non-respirable asbestos-containing particles are found in surface dust samples caused by W.R. Grace's asbestos-containing surface treatment products.

When the average length and width of the asbestos structures from the directly prepared air samples that were collected at the TCC building, as well as the Arkansas buildings, were compared to the length and width of the asbestos structures in the dust samples collected previously at the TCC building, there was little difference in the fiber size averages between the air and the dust samples (see Longo Expert Report October 25, 2006). Logically, if you break something up, then the pieces have to get smaller. In this case, the asbestos structures are not smaller in the dust sample results as compared to the direct air sample results. Dr. Lee has stated that the D-5755-3 Dust Method breaks up the asbestos structures into smaller components in the dust samples. Again, the Tucson findings do not support Dr. Lee's opinion that the ASTM D-5755-3 Dust Sample Method preparation step breaks up the asbestos structures.

To verify the Tucson study results, air and dust samples were re-analyzed from the Lancaster Keist Library work practice ceiling tile replacement study that was performed in 1991. Air and dust samples were compared in the same way as described with the Tucson study. Archived air samples were prepared by the direct method and then compared to the indirect dust samples that were collected at the time of the study. The Lancaster library results confirmed what was found in the Tucson study. That is, there were non-encapsulated free respirable fibers found in the direct air samples. Additionally, the asbestos structure length in the air sample was shorter than the indirect dust sample analysis (see Table 5).

It is clear from these studies that the ASTM D-5755-3 Sample Dust Method provides an accurate asbestos contamination index for surface dust in the vicinity of in-place W.R. Grace asbestos-containing surface treatment products.



The Tucson TCC study also demonstrated that a simple cleaning activity that involves the disturbance of asbestos-containing surface dust can produce significant airborne asbestos fiber levels as measured by directly prepared air samples using both the NIOSH 7400 PCM and EPA TEM method. Also these results are consistent with the directly prepared PCM and TEM analysis from the Lancaster Library study.

The directly prepared air sample results for the Tucson study and Lancaster study demonstrates quite plainly the overall problem with asbestos contaminated surface dust in the vicinity of the in-place W.R. Grace asbestos-containing surface treatment products. If asbestos-contaminated surface dust is disturbed in some manner, such as routinely happens during maintenance and/or other building activities, there is a high potential for significant asbestos exposure to either building occupants or maintenance personnel.

Based on these studies, it is my opinion that when typical asbestos-containing W.R. Grace surface dust is disturbed in buildings, such as the State of California, Department of General Services, maintenance personnel can be exposed to significant airborne exposure levels of OSHA asbestos fibers. These levels in my opinion could exceed the 1972 OSHA excursion limit of 10 fibers/cc.

7.0 The ASTM D5575 dust method is a Scientifically Reliable Method

Another one of the opinions that Dr. Lee provides in most all of expert reports on behalf of W.R. Grace is that "the published literature shows that surface dust sampling and analysis for asbestos content is not scientifically reliable".³³ The published literature cited by Dr. Lee consisted of only one paper by Dr. Eric Chatfield. In Dr. Chatfield's study, he conducted certain described experiments and from these concluded that when asbestos-containing surface treatment products were abraded with a scalpel they did not release free respirable asbestos fibers despite the fact he found such free fibers using the ASTM Dust Method. Dr. Chatfield opined that the free respirable fibers he found were an artifact because of the indirect sample preparation method.

Dr. Chatfield stated this conclusion because free asbestos fibers fall very slowly in air, and that he had collected the surface dust samples in a faster time frame during the experiment than the amount of time required, theoretical chrysotile fiber fall rate, for any free asbestos fibers to have accumulated on the sampled surface. Hence he then attributed his findings to the breakup of large asbestos structures to the indirect sample preparation portion of the ASTM D5755-03 dust method and did not consider any other explanation that could have accounted for his results.

I will state that Dr. Chatfield's data and conclusions are flawed in his 2000 study because he did not take into account that when free asbestos fibers are released from a product, they will fall faster in the air than the simple theoretical rate he used because other factors which he did not

³³ E. Chatfield (2000), "Correlated Measurements of Airborne Asbestos-Containing Particles and Surface Dust" Advances in Environmental Measurement Methods for Asbestos, ASTM STP 1342, M. Beard and H. Rook Eds., American Society for Testing and Materials.



take into account are affecting the theoretical settling rate. These other factors are interactions including fiber/particle collisions, particle growth, and electrostatic attraction between particles. In fact, as stated by Dr. Morton Corn, in "highly concentrated fiber clouds the phenomenon of coagulation also acts to 'grow' particles or fibers, leading to their more rapid removal from air. These mechanisms are well understood and established and are described in standard textbooks used in industrial hygiene."³⁴ Dr. Chatfield did not take into account these other mechanisms in his fall rate experiments.

I will testify that if Dr. Chatfield had run the proper controls in his experiment, he would not have made these erroneous conclusions in his study. When a portion of his experiment was reproduced at MAS with the proper controls, free respirable chrysotile fibers were found on the surface 40 centimeters below the abrasion activity on an ACM product within the same sampling times that Dr. Chatfield used. In our study, we ran a control that consisted of dust and fallout samples that were also prepared by the direct and indirect methods only to compare fiber size distributions. When the fiber sizes were compared between the directly prepared samples and the indirect dust samples, they were consistent. Additionally, I will discuss the preparation of Monokote-3 surface dust that was prepared with alcohol only. This has the effect of not dissolving any gypsum particles or mixtures. The results show that the dust sample contained numerous free respirable fibers and bundles.³⁵

Dr. Lee's opinion that the ASTM D5755 Dust Method is not accepted in the scientific community is based on one flawed study that was performed by Dr. Chatfield. Our studies clearly show that Chatfield was wrong in his conclusions concerning his work and Dr. Lee therefore, has no basis to suggest that this method is not accepted by many scientists, consultants and others who work in this field.

7.1 ASTM D5755-03 Dust Method Standard Approval Process

The process for standardizing an ASTM analytical method is one of the more rigorous procedures in the scientific community and usually requires a number of years for completion, as well as thousands of man hours of work. The ASTM D-5755 Dust Sample Method was first balloted in 1989; there were approximately 125 members on the D-22-05 Subcommittee of ASTM's Committee on Sampling Analysis of Atmospheres. Under ASTM's approval process, one negative vote out of the 125 Subcommittee members could send the method back to the subcommittee for further review. Hence, the reason for the negative vote must be seriously considered and processed. Once the subcommittee approves a draft method, it must be voted on by the full D22 Subcommittee. Once approved by the full Subcommittee, the entire ASTM membership (approximately 34,000 members) has the opportunity to review the proposed method and

³⁴ Morton Corn, Ph.D., CSP, Expert Report Addressing the Testimony of Joseph H. Guth, Ph.D., Morton Corn & Associates, Inc., Queenstown, Maryland, 21658; In Goldberg Group 7 Bill Bays, et al, Plaintiffs vs. A. Best Products Company, et al, Defendants, Case No. 293588-027, Court of Common Pleas, Cuyahoga County, Ohio, September 26, 2000.


³⁵ William E. Longo, Ph.D. personal correspondence to Mr. Michael Rowland regarding Memphis Methodist Hospital, Dust Sample HE 7-C-A-03.



to vote against it if they doubt the scientific validity of the method. This process was completed in 1995 at which time the D5755 dust method was a certified ASTM Standard

After the final approval, an approved ASTM method is reexamined every five years and must be approved each time by the membership. The ASTM D-5755 Dust Sample Method was reapproved and re-promulgated in 2003, now carries the designation D-5755-03, and is entitled "Standard Test Method for Microvacuum Sampling and Indirect Analysis of Dust by Transmission Electron Microscopy for Asbestos Structure Number Surface Loading" (the "D-5755 Dust Sample Method").

For all these reasons discussed, and more fully discussed in my December 8, 2005 expert report (see Reference 2 to this report), the ASTM D5755-03 dust method is accepted, has been peer reviewed, reliable, reproducible, and has a measurable rate of error. Additionally, the D-5755 dust method is particularly valuable to assess asbestos contamination in surface dust released from friable W.R. Grace asbestos-containing surface treatment products, such as Monokote-3 and Zonolite Acoustical Plastic, which are in the State of California, Department of General Services that were discussed at length in this report.



William E. Longo, Ph.D.



Date